System Specification

Consolidated Shuttle Data Stream (CSDS) Gateway Certification

Thor DP1

Checkout and Launch Control System (CLCS)

84K00302-026

Consolidated Shuttle Data Stream (CSDS) Gateway

Certification

March 20, 1998

Consolidated SDS Gateway
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1. Introduction

1.1 Consolidated Shuttle Data Stream Overview.

This system provides expandable Consolidated Shuttle Data Stream (SDS) that integrates current SDS Data with data from other data sources including the Fuel Cell Measurement System (FCMS) and LC-39 Pad Meteorological (Metro) System. The new SDS is referred to as SDS Prime (SDS') and is PC-Goal Compatible. The Gateway also re-transmits raw Metro data to the CLCS Consolidated Systems Gateways via Ethernet. The CSDS system was certified for the Redstone Delivery.
The Thor delivery will complete the release of the Consolidated Shuttle Data Stream Gateway. The Gateway will be upgraded to be compatible with other CLCS Gateway hardware and software. Thor capabilities include transition to Power PC platform, incorporation of Gateway Common Services, GMS data processing and retransmission, and implementation of GUI interface for command and control.

1.2 Consolidated Shuttle Data Stream Concept

Figure 1 is a high-level hardware diagram showing major system components and data flows. Two racks, a prime and a back-up, comprise the SDS Gateway and house VME systems that process Metro and FCMS Data and generate a new SDS data stream (SDS'). Each rack is capable of generating four SDS', one for each orbiter in flow. The system can also re-transmit Metro and GMS data to the CLCS consolidated Systems Gateways via Ethernet. The SDS' data stream has been certified and released to operations. The system is under configuration control to support the PC-Goal user community.

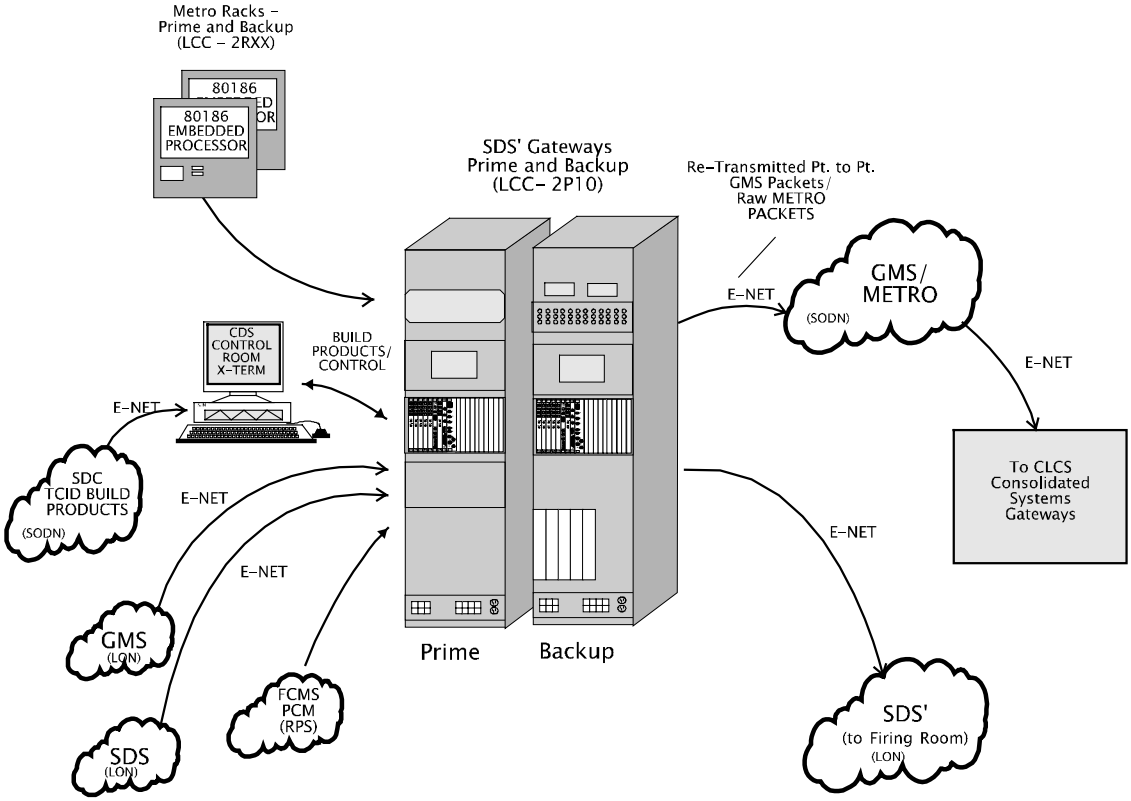

Figure 1: Consolidated SDS Thread System Diagram

1.3 Certification

The following steps were completed for the Consolidated Shuttle Data Stream Certification:

- Installed CSDS Gateway in operational area
- Placed the CSDS Gateway under operational configuration control
- Performed CSCI Integration Test/Quality Test (CIT/QT)
- Performed System Test
- Performed Regression Test
- Performed Baseline Acceptance Test (USA)
- Held Open Items Review
- Supported Launch Rollout Review
- Provided operational training
- Turned over Hardware Sustaining to USA
- Note: CLCS retained software sustaining engineering

1.4 Thor Capabilities

The capabilities to be included for Thor are:

- GMS processing (1 LM)
    - CLCS is awaiting Interface Control Document (ICD) from User
    - Update Software
- Transition to Power PC (1 LM)
- Upgrade VME Chassis to Production Chassis (2 LM)
- Implement GUI interface (1 LM)
- Perform CIT/QT, System Testing, and Operational Testing (2 LM)
- Provide Users' Guide and Operations & Maintenance (O&M) Manual (1 LM)

2. Lessons Learned

Development

1. Write Solid and Testable Functional and System Level Requirements
2. Requirements testing should be considered during the development process and test mechanisms developed and validated then.
3. Require early involvement from USA on requirements, CIT, AT
4. Include Operations in developing User Interface
5. Provide Engineering Drawings and documentation to support hardware installation

Testing

1. Write thorough Test Procedures, testing all requirements
2. Define level of procedural detail that is required and to what extent this should impact schedule (Two philosophies: The first is that the test should be of sufficient quality to test the design requirements being tested with operator knowledge of the system being assumed. The second is that the document should be of sufficient quality to be run by persons with no knowledge of the system.)
3. A schedule needs to be set and adhered to for documentation releases and redlines. Only timely redlines to test procedures or redlines that affect safety should be accepted
4. Write a test procedure that is generic enough to cope with a dynamic environment. When testing in an operational environment, configurations may change due to support requirements (such as available TCID). Also, OS messages may change slightly with a new release or may be displayed out of order.
5. Coordinate USA Acceptance Test early on in deployment planning

Schedule

1. Schedule to include enough time to complete hardware installation, software load, dry run test procedures, modify procedures, and run with QA

Configuration Control

1. Arrangements must be made to freeze the configuration until the test is complete or to return the equipment to a pre-determined configuration each time the test is run.
2. Do not finalize the procedure until the baseline configuration for the tested function is complete and stable.
3. The test conductor should verify that no remote testing is occurring on the system under test. Any activity not associated with the formal test should be discontinued until formal tests are complete.

Operations

1. Plan for 30-day Operations Evaluation Period
2. Assist in the development of Operations Procedures
3. Provide Operations and End User Training

3. Documentation:

Requirements Document
Operations Concept Document
CIT/QT Test Plan/ Procedures and Test Report
System Test Plan and Test Report
Regression Test Plan and Test Report
Baseline Test Plan (Acceptance Test Plan) and Test Report
Training Presentation/Class
Engineering Drawings
Vendor Manuals
S/W licenses and maintenance agreements
Users' Guide (Thor), which includes Operating Procedures
Operations & Maintenance Document (Thor), which includes:

- Theory of Operations
- Vendor manuals (hardware and software)
- Maintenance requirements / actions
- Detailed parts list
- Specific hardware configuration information (NVRAM, jumpers)
- Right to copy vendor documentation
- Troubleshooting guide